

The field identification of the bustards and korhaans (Otididae) of southern Africa

Text by David G. Allan^a and colour plates by Rob A. G. Davies^b

Résumé: Les outardes d'Afrique australe sont souvent mal identifiées. Le présent article examine l'identification sur le terrain des 11 espèces de la région et donne un bref aperçu de leur statut taxonomique, leur endémisme, leur distribution, leur habitat et leurs vocalisations.

Southern Africa has the highest diversity of bustards found anywhere in the world. No less than 11 of the world's 23 species are found in the sub-continent; assuming that the resurrected taxonomic 'split' of the Black Korhaan into two species *Eupodotis afra* and *E. afraoides*¹⁻² is valid. For the purposes of this article, southern Africa is defined as the area lying south of the Kunene and Zambezi Rivers and comprises South Africa, Lesotho, Swaziland, Namibia, Botswana, Zimbabwe and southern Mozambique. The 11 species are:

Kori Bustard *Ardeotis kori*
Stanley's Bustard *Neotis denhami*
Ludwig's Bustard *N. ludwigii*
White-bellied Korhaan *Eupodotis senegalensis*
Blue Korhaan *E. caerulescens*
Karoo Korhaan *E. vigorsii*
Rüppell's Korhaan *E. rueppellii*
Red-crested Korhaan *E. ruficrista*
Black-bellied Korhaan *E. melanogaster*
Black Korhaan *E. afra*
White-winged Black Korhaan *E. afraoides*

At least one species is present at any locality in the sub-region, with the exception of the alpine grasslands of Lesotho, Afromontane forest, coastal forest along the eastern seaboard, and areas with extremely steep topography. In parts of the eastern Cape Province in South Africa, no less than eight species can be found in close proximity to one another.

Common and scientific names

Stanley's Bustard is the common name used in southern Africa³ for the local breeding race *N. d. stanleyi* of the widespread Denham's Bustard. *Birds of Africa*⁴ lists this alternative name and it is used here for clarity, as only this subspecies is discussed in detail. The smaller species of bustards in the genus *Eupodotis* are known as 'korhaans' in the sub-region³ and *Birds of Africa* uses 'korhaan' as the primary name for those species restricted to southern Africa but only as an alternative name for the three *Eupodotis* species extending further

north in Africa (*E. senegalensis*, *ruficrista* and *melanogaster*). For consistency, 'korhaan' has been used here for all these small bustards. In southern Africa, the scientific name *E. cafra* (and not *E. senegalensis*) is used for the White-bellied Korhaan^{3,5-7}, but this is incorrect⁸. *Birds of Africa* uses the word 'Crested' in the common name for *E. ruficrista* but 'Red-crested' is employed locally³ for the subspecies *E. r. ruficrista* found in southern Africa. It has been used here for clarity, as only this race will be covered in any depth.

Various common names are being applied by the major fieldguides and handbooks in the sub-region relevant to the recent split of the Black Korhaan into *E. afra* and *E. afraoides*. Roberts' *Birds of Southern Africa*⁶ and Newman's *Birds of Southern Africa*⁵ are using the names Black Korhaan for *afra* and 'Whitequilled Korhaan' for *afraoides*, while SASOL *Birds of Southern Africa*⁷ is using 'Southern Black Korhaan' for *afra* and 'Northern Black Korhaan' for *afraoides*. The list committee of the Southern African Ornithological Society⁹, however, stipulates the names Black Korhaan for *afra* and White-winged Black Korhaan for *afraoides*, and this has been followed here.

Taxonomy

Both the higher and lower order classification of the Otididae have had controversial histories¹⁰. Relevant to

Plate 1

- | | |
|---|---|
| 1 Kori Bustard
(Outarde Kori) | <i>Ardeotis kori</i> |
| 2 Stanley's Bustard
(Outarde de Denham) | 2a female (femelle) 2b male (mâle)
<i>Neotis denhami</i> (stanleyi) |
| 3 Ludwig's Bustard
(Outarde de Ludwig) | <i>Neotis ludwigii</i> |
| 4 White-bellied Korhaan
(Outarde du Sénégal) | 4a female (femelle) 4b male (mâle)
<i>Eupodotis senegalensis</i> (barrowi) |
| 5 Blue Korhaan
(Outarde plombée) | 5a female (femelle) 5b male (mâle)
<i>Eupodotis caerulescens</i> |

By Rob Davies



Alan Davies

this article, the specific status of three taxa in particular have been hotly debated. Strong arguments have been presented¹¹⁻¹³ that the isolated southern *E. ruficrista* comprises a separate species from the two forms found further north in Africa, which in turn may also be separate species from one another. This viewpoint has been accepted by a recent and comprehensive review of the taxonomy of the world's birds⁸. Similarly, the specific distinctiveness of the Karoo and Rüppell's Korhaans has been disputed in the past but appears now to have gained widespread acceptance^{4,6,8-9}.

The taxonomic history of the 'Black Korhaan' forms *E. afra* and *E. afroides* has recently been reviewed². These two forms were initially described as separate species but were subsequently treated as races of the same species, apparently without much critical appraisal. Recently Clancey¹ argued strongly that the two forms should not be treated as conspecific. Even more recently, Crowe *et al.*² examined the issue in detail and concluded that the differences between the two taxa in 'habitats, plumage, morphometrics, displays and vocalisations of males, mitochondrial DNA restriction fragment length polymorphisms and, possibly, social systems' strongly suggested that they are separate species. This conclusion was reached despite the finding that hybridisation occurs in the limited area of overlap.

Endemism

Six species are endemic or virtually endemic to the region: Ludwig's Bustard, and the Blue, Karoo, Rüppell's, Black, and White-winged Black Korhaans^{1,14}. In addition, four other species are represented by highly isolated endemic or virtually endemic subspecies: Kori Bustard *A. k. kori*, Stanley's Bustard *N. d. stanleyi*, White-bellied Korhaan *E. senegalensis barrowii* and Red-crested Korhaan *E. r. ruficrista*⁴. If the last form is accepted as a full species, then it comprises a seventh southern African endemic¹⁴. Even the eleventh southern African species, the Black-bellied Korhaan, has an endemic subspecies in the region, *E. m. notophila*, which is restricted to the area south of the Zambezi River but is widely contiguous with the subspecies occurring to the north⁴.

Identification

Data collection during the Southern African Bird Atlas Project¹⁵ showed that bustards and korhaans are widely misidentified by many observers. The most typical mistakes are:

- 1) recording Stanley's and Ludwig's Bustards as Kori Bustards, ie believing that all large bustards are Kori Bustards
- 2) recording Ludwig's Bustard as Stanley's Bustard
- 3) confusing the calls of the Blue and Karoo Korhaans

in the general region where these two species overlap

- 4) confusing the Karoo and Rüppell's Korhaans
- 5) confusing Red-crested, Black-bellied and White-winged Black Korhaans.

The marked sexual dimorphism in several species compounds these identification problems. Ignorance of the general distribution and habitat of each species further facilitates misidentification.

The large bustards

Kori Bustard

In southern Africa, the Kori Bustard is widespread in relatively arid (<500 mm rainfall/annum) savanna woodlands, except for the dense closed-canopy woodlands, eg *Brachystegia* woodland, in Zimbabwe and Mozambique. It is also widespread in the arid Karoo shrublands of western South Africa and southern Namibia, where it is associated with tall acacia-lined watercourses in otherwise open country.

This is the largest bustard in the region. Its size, dark crest, and lack of any red on the hindneck and upper mantle are diagnostic. In flight it can be told from Stanley's and Ludwig's Bustards by its extremely slow and laborious wingbeats, its upperwing pattern which appears uniformly speckled grey and lacks the striking white markings of the two smaller bustards, and its 'flat-headed' appearance.

Stanley's Bustard

Until relatively recently, Stanley's Bustard was thought to be widespread in South Africa, eg Brooke¹⁶. Herholdt¹⁷, however, showed that its purported occurrence in the dry grasslands of the Orange Free State and in most of the Karoo were based on misidentifications with Ludwig's Bustard. Stanley's Bustard actually has a relatively restricted range. It occurs only in the highest-rainfall grasslands in the east and south-east of the country, extending westwards in a narrow strip directly adjacent to the south coast where it inhabits planted pastures and cereal croplands in the fynbos biome of the south-western Cape. It is present in the Karoo only in parts of the eastern Cape, where it is a non-breeding wanderer into karroid areas directly adjacent to grasslands. This is the only area where it regularly overlaps with Ludwig's Bustard and the two species can be found in mixed flocks (pers obs). It is also a non-breeding visitor to parts of the central Transvaal woodlands, where it is regularly misidentified with the Kori Bustard. Several local fieldguides have ignored Herholdt's findings and continue to show the range of Stanley's Bustard as extending much further than it does, eg Newman⁵ and Maclean⁶. The central African race *N. d. jacksoni* is a rare, non-breeding visitor to

extreme north-eastern Namibia, northern Botswana and north-western Zimbabwe³.

The head pattern of this species is diagnostic. The crown is black, with a white stripe down the middle, there is a prominent white supercilium, and the ear coverts are plain grey. There is a conspicuous broad black wing panel, with striking white markings superimposed on it. The foreneck of the male is plain grey, gradually merging into the white underparts. The foreneck of the female is finely barred black-and-white, appearing grey at a distance, and is clearly demarcated from the white underparts. In a few males observed in the south-western Cape, perhaps old individuals, the face and foreneck were black, resembling the brown face and foreneck of Ludwig's Bustard (pers obs). Males are noticeably larger than females and have darker, plainer backs. The colour of the hindneck and upper mantle differs subtly from Ludwig's Bustard, being dark red, as opposed to pale rufous in the latter species. In flight, Stanley's Bustard appears lighter in colour on the head and foreneck than Ludwig's Bustard, and the white markings on the upperwing coverts extend further up the wing towards the body. In Stanley's Bustard, primaries 4-5 are strikingly white, while in Ludwig's Bustard primaries 5-6 are the whitest. Stanley's Bustard males have a striking display in which the neck and chest feathers are erected to present a pure white 'balloon' as seen from the front¹⁸⁻¹⁹.

Contrary to popular opinion, eg Clancey²⁰, this species is largely silent (eg Smith¹⁸, Tarboton¹⁹ and pers obs). It occurs in flocks of up to about 30 individuals and tends to form single sex groups²¹.

Ludwig's Bustard

Ludwig's Bustard was also thought to be more widely distributed than it is, due to misidentification with Stanley's Bustard. It was believed to occur throughout the grassland biome of South Africa, eg Clancey²² and Brooke¹⁶. Herholdt¹⁷, however, showed that it is largely absent from grasslands, except as a non-breeding vagrant to the arid western grasslands of the Orange Free State directly adjacent to the Karoo, and is essentially a Karoo and Namib desert bird. It also occasionally wanders into the southern Kalahari along calcrete watercourses and even into the agricultural areas of the south-western Cape.

Compared to Stanley's Bustard, the head and foreneck of Ludwig's Bustard are brown, the black-and-white wing panel is much reduced, and the back is more patterned. In some adult male Ludwig's Bustards there is a white crown stripe, similar to that found in Stanley's Bustard. In flight it appears darker on the head and foreneck than Stanley's Bustard, and the white markings on the upperwing coverts are largely con-

fined to the outer half of the wing. Ludwig's Bustard males have a similar display to that found in Stanley's Bustard. The white chest feathers are erected but the brown foreneck feathers form a dark rectangle in the middle of the otherwise white balloon as viewed from the front. In this species the display is accompanied by a loud booming call. This far-carrying sound is characteristic of the arid regions of South Africa and Namibia after localized rain. Ludwig's Bustards occur in flocks of up to 80 individuals²³.

The *Eupodotis korhaans*

Kemp and Tarboton²⁴ showed how the *Eupodotis korhaans* can be divided into two groups, based on their morphology, habitats and behaviour. The White-bellied, Blue, Karoo and Rüppell's Korhaans have pale underparts, only slight sexual dimorphism, inhabit relatively open habitats, are found in pairs or small family groups, have duetting calls, and do not have aerial displays. The Red-crested, Black-bellied, Black and White-winged Black Korhaans have black underparts, at least in the males, marked sexual dimorphism, live in relatively closed habitats, do not maintain permanent pair bonds, and have non-duetting calls and eye-catching aerial displays.

White-bellied Korhaan

This species inhabits open and relatively tall grassland in the eastern parts of South Africa and south-western Swaziland but it also enters lightly wooded areas. There is an isolated population in the eastern Cape Province.

It is most similar in appearance to Rüppell's Korhaan but the ranges of these two species are widely separated. The combination of golden hindneck, blue foreneck and white belly in the males is diagnostic, and the former feature is the key character differentiating the southern race of this species from the forms found further north in Africa. The female has a brown neck and resembles the female Black-bellied Korhaan, both of which have white underparts, but differs in lacking the long neck and legs, and black underwing coverts of that species. The base of the bill is an obvious reddish colour in both sexes, a feature shared only with the males and females of the Black and White-winged Black Korhaans. Its call is a distinctive *takwa-takwarat*, which is higher-pitched, more rhythmical and has more syllables than the otherwise similar call of the overlapping Blue Korhaan.

Blue Korhaan

The Blue Korhaan inhabits open and relatively short grasslands in South Africa and western Lesotho. Its distribution extends deep into the Karoo-grassland ecotone, where it overlaps with the Karoo Korhaan.

The blue underparts of this distinctive species are diagnostic and it is the only korhaan to show blue in the wings in flight. Adult males have white ear coverts, while those of adult females are brown and those of immatures are blackish. The call is a deep *krok-kaa-krow* ('knock-me-down'), which is relatively unrhythmical and discordant, compared with that of the Karoo Korhaan. When flushed, this species always flies off calling loudly, whereas the Karoo Korhaan usually flushes silently.

Karoo Korhaan

This species is restricted to the dwarf shrublands of the Karoo biome in South Africa and southern Namibia, except in the south-western Cape where it has colonized cereal croplands and planted pastures along the south coast in the fynbos biome.

The Karoo Korhaan is the dullest member of the group, being grey-brown above and below. In the male, there is a discrete black throat patch which is erected when calling. Females have a less well-developed throat patch and more mottled wing coverts²⁵ but sexual dimorphism is less well developed in this species than in any other southern African bustard. It is most similar to the female Rüppell's Korhaan but can be distinguished by the absence of the black line down the centre of the foreneck. The call is a deep, rhythmical two or three syllable *kraak-rak* or *crrok-rak-rak*, with a strong accent on the deeper first syllable.

Rüppell's Korhaan

This species is endemic to the gravel plains of the Namib Desert in western Namibia. It is marginally parapatric with the Karoo Korhaan along the south-eastern border of its range.

The male differs from the female, and from Karoo Korhaans, in his plainer back, blue neck and paler face with black facial markings. The black line down the centre of the foreneck in both sexes is shared only with the male of the non-overlapping Black-bellied Korhaan. The call is similar to that of the Karoo Korhaan but is higher pitched.

Red-crested Korhaan

The Red-crested Korhaan is found throughout the woodland regions of southern Africa, except in the eastern Cape Province and in the closed-canopy woodlands, eg *Brachystegia* woodland, in Zimbabwe and Mozambique. In the southern Kalahari it also occurs in rolling, grassy sand dunes devoid of any tree cover. Clancey¹¹ has proposed a fourth African subspecies, *E. r. ochofacies*, for the birds inhabiting this latter region, but this has received little support^{1,26}. The atypical habitat in which these birds occur and an obvious difference in their call (pers obs), however, suggests

that the birds in the open Kalahari sand-dunes merit further investigation.

This species overlaps widely with the Black-bellied and White-winged Black Korhaans and is regularly confused with both species. The crest in the male is only visible during courtship. The male differs from the female in having a plain grey crown, a grey neck and two conspicuous white patches on either side of the chest. The deep chevrons on the back of both sexes are diagnostic and contrast with the mottled back of the Black-bellied Korhaan and the barred back of the White-winged Black Korhaan. In flight all three species have a white bar on the upperwing formed by the white wing coverts but the Red-crested Korhaan does not show any white in the remiges, unlike the other two species. The male has a protracted call which is a characteristic sound of the woodlands of southern Africa. It starts with a series of measured clicks *tic-tic-tic*, which build up into an extended series of loud piping whistles *pi-pi-pi...pipity-pipity-pipity*, which last for several minutes. In the spectacular but silent aerial display, the male flies straight up and then appears to stall and somersault, before falling precipitously back to the ground and gliding away just before landing.

Black-bellied Korhaan

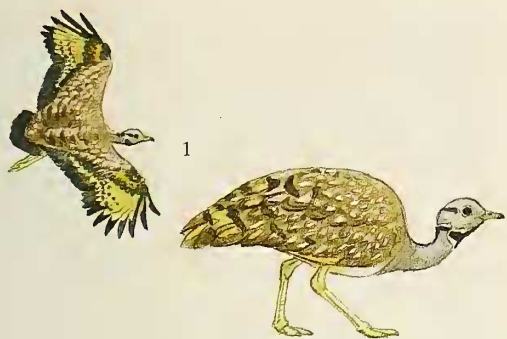
This species favours areas of tall grass, either in woodland or in open areas, in the moister eastern parts of the subcontinent. It is the only bustard occurring in the *Brachystegia* woodlands in Zimbabwe and Mozambique.

It overlaps fairly widely and is regularly confused with the Red-crested Korhaan. It does not overlap with the White-winged Black Korhaan but these two species are still misidentified by novice birders. The extremely long, thin legs and neck of this species are diagnostic.

Plate 2

1 Karoo Korhaan (<i>Outarde de Vigors</i>)	<i>Eupodotis vigorsii</i>
2 Rüppell's Korhaan (<i>Outarde de Rüppell</i>)	2a male (<i>mâle</i>) 2b female (<i>femelle</i>) <i>Eupodotis rueppellii</i>
3 Black-bellied Korhaan (<i>Outarde à ventre noire</i>)	3a female (<i>femelle</i>) 3b male (<i>mâle</i>) <i>Eupodotis melanogaster</i>
4 Red-crested Korhaan (<i>Outarde bouppette</i>)	4a male (<i>mâle</i>) 4b female (<i>femelle</i>) <i>Eupodotis ruficrista</i> (<i>ruficrista</i>)
5 White-winged Black Korhaan (<i>Outarde à ailes blanches</i>)	5a male (<i>mâle</i>) 5b female (<i>femelle</i>) <i>Eupodotis afroides</i>
6 Black Korhaan (<i>Outarde korhaan</i>)	6a male (<i>mâle</i>) 6b female (<i>femelle</i>) <i>Eupodotis afro</i>

By Rob Davies



The back is spotted and barred and appears mottled in the field. The male has a black throat with a black line running down the centre of the foreneck to the breast, and black underparts. The female is plainer with a brown head and neck, and white underparts, and can be confused with the female of the partially overlapping White-bellied Korhaan. In its impressive but silent display flight, the male shows striking and diagnostic large white patches in its primaries, secondaries and upperwing coverts, as it leisurely flies around in wide circles with exaggerated wingbeats. The female can be told from other korhaans in flight by the combination of white underparts, white in the primaries, and black

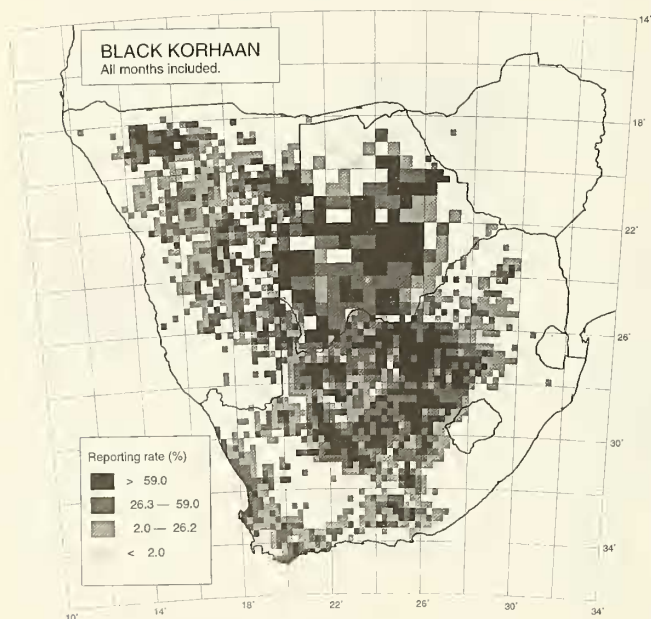
underwing coverts. The call of the male is unique but easily overlooked. It is a short, sharp *chikk*, followed several seconds later by a loud *pop*.

Black and White-winged Black Korbaans

The accompanying map shows the combined distribution of these two taxa in southern Africa, based on data from the Southern African Bird Atlas Project¹⁵. Unfortunately the two species were not differentiated during the atlas period. The largely isolated population found along the west and south coasts in South Africa, however, corresponds with the Black Korhaan, and the remainder of the distributional records in the north refer to the White-winged Black Korhaan². The two

species meet only in the Fish River valley in the eastern Cape Province, where this river cuts through the mountains of the Great Escarpment that otherwise separate the two. Further to the west, however, there are large tracts of apparently suitable habitat between the ranges of the two species and where neither occurs. The Black Korhaan inhabits the shrublands of the fynbos and succulent Karoo biomes, while the habitat of the White-winged Black Korhaan is open dry grassland and a mixture of grassland and Nama karoo shrubland, and lightly wooded savanna².

The only other *Eupodotis* species within the range of the Black Korhaan is the dissimilar Karoo Korhaan. The males of the Black and White-winged Black Korhaans, with their virtually all-black necks and heads, should not be confused with any other *Eupodotis* species. The female of the White-winged Black Korhaan,



The Southern African Bird Atlas Project map for the Black and White-winged Black Korhaans in southern Africa.

Unfortunately records for the two forms were not distinguished during the atlas period. However, the 'L'-shaped cluster of contiguous records along the western and southern South African coasts represent the distribution of the Black Korhaan. The remaining, largely separated records from the interior of southern Africa represent the distribution of the White-winged Black Korhaan. The data are plotted by 15' x 15' grid squares (about 25 km x 25 km), except for Botswana where 30' x 30' (about 50 km x 50 km) grid squares are used. The intensity of shading in each square represents the reporting rate, ie the number of check lists for each square which recorded the species, expressed as a percentage of the number of check lists received for that square. Therefore the four classes of shading represent squares in which the species was recorded on more than 59 per cent, 26.3 to 59 per cent, 2 to 26.2 per cent, and less than 2 per cent of cards. This reporting rate information reveals that overall the Black Korhaan is less common, or at least less conspicuous, than the White-winged Black Korhaan.

Répartition de l'Outarde korhaan et de l'Outarde à ailes blanches en Afrique australe (Southern African Bird Atlas Project; Projet d'Atlas des Oiseaux d'Afrique Australe). Pendant la période couverte par l'Atlas, les observations des deux formes n'ont malheureusement pas été distinguées. L'ensemble, en forme de 'L', des observations contiguës situées le long des côtes occidentales et australes d'Afrique du Sud, représente la répartition de l'Outarde korhaan. Les autres observations - très espacées - en provenance de l'intérieur de l'Afrique australe, représentent la répartition de l'Outarde à ailes blanches. Les données sont marquées par des carrés de 15' x 15' (environ 25 km x 25 km), sauf pour le Botswana, pour lequel des carrés de 30' x 30' (environ 50 km x 50 km) ont été utilisés. L'intensité de chaque carré indique le taux des observations signalées, c'est à dire le pourcentage des observations pour chaque carré. Ainsi, les quatre intensités représentent des carrés dans lesquels l'espèce fut notée sur, respectivement, plus de 59 pour cent, de 26,3 à 59 pour cent, de 2 à 26,2 pour cent, et moins de 2 pour cent des fiches. Cette information sur le taux de signalement révèle qu'en général l'Outarde korhaan est moins commune, ou du moins moins apparente que l'Outarde à ailes blanches.

however, is easily confused with the widely overlapping Red-crested Korhaan. The red base to the bill, barred back and bright yellow legs are useful distinguishing features. The arresting display flight in both the Black and White-winged Black Korhaans involves the male flying up and cruising around in circles before slowly parachuting back to the ground with the wings held high up and the legs dangling. The display flight is accompanied by a raucous, ear-splitting and incessant call *kerrak-kerrak-kerrak* extending for several minutes. Males also spend prolonged periods standing and calling from exposed positions, eg on antheaps, during the breeding season. These korhaans are amongst the most familiar sights and sounds in the regions they inhabit and they are far-and-away the most obvious of the bustards in the sub-region.

Distinguishing between these two species in the field is rarely relevant as their ranges are largely allopatric. The key plumage difference is that both sexes in the White-winged Black Korhaan have a large white patch in the primaries easily visible when the birds are in flight. In the Black Korhaan the primaries are all black. Black Korhaans of both sexes also have darker crowns than White-winged Black Korhaans, and the reddish-brown bars on the back are narrower than the black bars, whereas in the White-winged Black Korhaan the reddish-brown and black bars are of equal width². ②

References

- Clancey, P.A. 1989. Four additional species of southern African endemic birds. *Durban Museum Novitates* 14: 140-152.
- Crowe, T.M., Essop, M.F., Allan, D.G., Brooke, R.K. and Komen, J. 1994. 'Overlooked' units of comparative and conservation biology: a case study of a small African bustard, the Black Korhaan *Eupodotis afra*. *Ibis* 136: 166-175.
- Clancey, P.A. 1980. *S.A.O.S. Checklist of Southern African Birds*. Pretoria: Southern African Ornithological Society.
- Urban, E.K., Fry, C.H. and Keith, S. (eds) 1986. *The Birds of Africa*. Vol. II. London: Academic Press.
- Newman, K. 1992. *Newman's Birds of Southern Africa*. Fourth edition. Johannesburg: Southern Books.
- Maclean, G.L. 1993. *Roberts' Birds of Southern Africa*. Sixth edition. Cape Town: John Voelcker Bird Book Fund.
- Sinclair, I., Hockey, P., Tarboton, W., Hayman, P. and Arlott, N. 1993. *Illustrated Guide to the Birds of Southern Africa*. Cape Town: Struik.
- Sibley, C.G. and Monroe, B.L. 1990. *Distribution and Taxonomy of Birds of the World*. New Haven: Yale University Press.
- Clancey, P.A., Brooke, R.K., Crowe, T.M., and Mendelsohn, J.M. 1991. *S.A.O.S. Checklist of Southern African Birds. Second Updating Report 1991*. Johannesburg: Southern African Ornithological Society.
- Sibley, C.G. and Ahlquist, J.E. 1990. *Phylogeny and Classification of Birds: a Study in Molecular Evolution*. New Haven: Yale University Press.
- Clancey, P.A. 1977. Miscellaneous taxonomic notes on African birds. XLIX. *Durban Museum Novitates* 11: 223-238.
- Chappuis, C., Erard, C. and Morel, G.J. 1979. Données comparatives sur la morphologie et les vocalisations des diverses formes d'*Eupodotis ruficrista* (Smith). *Malimbus* 1: 74-89.
- Osborne, P.E. 1989. The bustard morphometrics database: an introduction and some preliminary findings. *Bustard Studies* 4: 125-134.
- Clancey, P.A. 1986. Endemicity in the southern African avifauna. *Durban Museum Novitates* 13: 245-284.
- Harrison, J.A. 1992. The Southern African Bird Atlas Project databank: five years of growth. *South African Journal of Science* 88: 410-413.
- Brooke, R.K. 1984. South African red data book - birds. *South African National Scientific Programmes Report* 97: 1-213.
- Herholdt, J.J. 1988. The distribution of Stanley's and Ludwig's bustards in southern Africa: a review. *Ostrich* 59: 8-13.
- Smith, M.J. 1987. Observations on Denham's Bustard *Neotis denhami* at Maralal, Kenya. *Scopus* 11: 47-51.
- Tarboton, W. 1989. Breeding behaviour of Denham's Bustard. *Bustard Studies* 4: 160-165.
- Clancey, P.A. 1967. *Gamebirds of Southern Africa*. Cape Town: Purnell.
- Allan, D.G. 1993. Aspects of the biology and conservation status of the Blue Crane *Anthropoides paradiseus*, and the Ludwig's *Neotis ludwigii* and Stanley's *N. denhami* Bustards in southern Africa. MSc. thesis. Cape Town: University of Cape Town.
- Clancey, P.A. 1972. The magnificent bustards. A preliminary assessment - part 1. *Bokmakierie* 24: 74-79.
- Allan, D.G. (in press) The abundance and movements of Ludwig's Bustard. *Ostrich* 65 (2).
- Kemp, A. and Tarboton, W. 1976. Small South African bustards. *Bokmakierie* 28: 40-43.
- Boobyer, M.G. 1989. The eco-ethology of the Karoo Korhaan (*Eupodotis vigorsii*). MSc. thesis. Cape Town: University of Cape Town.
- Johnsgard, P.A. 1991. *Bustards, Hemipodes, and Sandgrouse. Birds of Dry Places*. Oxford: Oxford University Press.

^aAvian Demography Unit, Department of Statistical Sciences, University of Cape Town, Rondebosch 7700, South Africa.

^bPO Box 1390, Halfway House 1680, South Africa.



Red-crested Korhaan *Eupodotis ruficrista*, Etosha, Namibia, November 1992 (Simon Harrap)
Outarde huppette Eupodotis ruficrista, Etosha, Namibia, novembre 1992 (Simon Harrap)



White-winged Black Korhaan *E. afraoides*, Etosha, Namibia, November 1992 (Simon Harrap)
Outarde à ailes blanches E. afraoides, Etosha, Namibia, novembre 1992 (Simon Harrap)